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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

ENGINEERING DIVISION  
WV DOH

## Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110  
Charleston, West Virginia 25305-0430 • (304) 558-3505

November 14, 2011

### MEMORANDUM

TO: PM (Through HD) *[Signature]*  
FROM: DD *82B*  
SUBJECT: Approval of ReCon Retaining Wall Systems

Attached is a completed Attachment II of MP 106.00.02 of the form HL-468, dated October 25, 2011, for the ReCon Retaining Wall Systems.

Based on the recommendations in Table 3.10.1.4b of the West Virginia Bridge Design Manual, the Engineering Division proposes approving the following systems.

#### Modular Block Retaining Wall, Class II

ReCon Retaining Wall System Series 50, positive connection system, with the following limitations: wall height shall be limited to 20 feet, no utilities shall be permitted in the reinforced fill, and they shall not be used in areas with erosion or scour below the reinforced fill zone.

#### Modular Block Retaining Wall, Class III

ReCon Retaining Wall System Series 50, friction connection system, with the following limitations: wall height shall be limited to 20 feet, no utilities shall be permitted in the reinforced fill, and they shall not be used in areas with erosion or scour below the reinforced fill zone.

Should you need additional information, please contact Mr. Thomas White at (304) 558-9718.

GLB:tc

Attachments

cc: DD, DDT(TGW, TW), DDT-File

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Office of the Deputy State  
Highway Engineers



- d. The size of the ReCon Block allows for many value engineered solutions. ReCon has combined its block with various sheet pile and h-pile wall designs. The wet cast system also allows for some flexibility in block design / modification

6. OUTSTANDING FEATURES OR ADVANTAGES CLAIMED:

- a. Aesthetics...ReCon comes in four different textures...granite, limestone, rustic, and Old World. ReCon can be stained to match any color desired, using either water born stains or acid etching. Given that ReCon is a precast product, it provides an element of design flexibility that allows ReCon to accommodate needs, not dictate them.
- b. Tall Gravity Walls...ReCon blocks come in varying depths (24", 39", 45", 60", 78" and 84") which allows for the design of tall unreinforced gravity walls. This provides great value to the customer when the wall is a "cut" and the cut is near a property line or if there are existing trees, utilities, or structures that need to remain undisturbed. Useable real estate at the base of the wall is maximized and construction costs are minimized with a tall gravity wall in a "cut" situation.
- c. Durable Concrete. ReCon blocks are made of wet cast air entrained concrete. This appeals to many customers, given the documented problems that have occurred with smaller dry cast retaining wall blocks when used in environments that are exposed to repeated freeze thaw cycles and / or road salts.

6a. ANY KNOWN OR PROBABLE ADVERSE AFFECT ON PRESENTLY USED OR INSTALLED MATERIALS, STRUCTURES OR EQUIPMENT:

There are many factors that play into the quality of a retaining wall. The quality of the block, the quality of the engineering, and the quality of the construction are each very important to the integrity of the wall. If any of these three key elements is substandard or deficient, you may have potential performance problems with the retaining wall. ReCon requires its manufactures (Licensees) have a Quality Control program in place. ReCon suggests that its customers have their walls engineered by a trained PE. ReCon suggests that its customers select trained and skilled contractors to construct their walls. ReCon began business in 2000. Through ReCon and its licensees, more than 3.5 million sq. ft. of ReCon walls have been installed around the world. ReCon is only aware of one ReCon wall that is experiencing adversity and potential failure. In 2003 a two tier wall was built with geo-grid reinforcement. This wall was built on about 8 to 10 feet of fill. The bottom tier is 10'8" in height, the top tier is 8' in height. In 2008 it was called to ReCon's attention that the wall had settled and was leaning forward. Measurements of the settlement have been taken (about 7 inches). It would appear that the foundation soils / imported fill had not been sufficiently compacted, resulting in the settlement. Repairs to this wall will likely be required. ReCon's consulting engineer has always (and to an even greater degree in recent years) set forth in writing on the stamped engineered plans the minimum required bearing capacity of the foundation soils and the recommendation that a geo technical engineer be on site to verify the suitability of the soils.

Again, if properly engineered and constructed, a ReCon wall will have a long life expectancy...50, 75, or more years.

7. MATERIAL COMPOSITION:

- a. The ReCon block unit shall consist of concrete with average 28-day compressive strength of no less than 4000 PSI.
- b. Concrete shall have air entrainment by volume (as measured in the plastic state in accordance with ASTM C172) of:
  - i. 5.5 – 8.5 percent, or
  - ii. In conformity with ASTM C94 (Table 1 and Section 7), latest revision.

8. MATERIAL SPECIFICATIONS FURNISHED BY MANUFACTURE? YES (Attached)
9. PLAN DRAWING, PICTURE, OR SKETCH FURNISHED BY MANUFACTURE? YES COPY ATTACHED: YES  
(Typical Construction Detail Drawings attached)

10. MEETS REQUIREMENTS OF THE FOLLOWING SPECIFICATIONS:

AASHTO: ReCon provides design software to design to:

- AASHTO LRFD / AASHTO 96 Allowable Stress

ASTM: ASTM C-1372 Specification for Segmental Retaining Wall Units (Section 7)  
ASTM C-94 Standard Specification for Ready Mix Concrete (Table 1 and Section 7)  
ASTM C-172 Standard Specification for Sampling Freshly Mixed Concrete

FEDERAL SPECS: NONE

11. APPROVED FOR PROPOSED USE BY HIGHWAY AUTHORITIES OR OTHER AGENCIES IN THE FOLLOWING STATES / ARE THEY USING IT:

Illinois...gravity and grid (YES)	Texas...gravity and grid (EVALUATION STATUS)
Iowa...gravity and grid (YES)	Utah...gravity and grid (YES)
Kentucky...gravity only (YES...QUOTED BUT NOT YET SOLD)	Wisconsin...gravity and grid (YES)
Minnesota...gravity and grid (YES)	
New York...gravity and grid (YES)	
Nebraska...gravity and grid (JUST RECEIVED APPROVAL, NO WALLS SOLD YET)	

ARE THEY USING IT? SEE ABOVE

12. ARE INSTRUCTIONS OR DIRECTIONS FOR INSTALLATION, APPLICATION OR USE AVAILIABLE?

YES COPY ATTACHED: YES

13. WILL DEMONSTRATION BE PROVIDED? YES. At the request of the WVDOT

14. ARE EDUCATIONAL COURSES OR MOVIES AVAILIABLE? YES...Benefits Overview Video, Power Point on Installation, Power Point for Specifiers and Customers.to understand ReCon "niche" and "value added".

15. AVAILABILITY:

SEASONAL: Product is available anytime subject to desired texture, block size, and quantity needed.

DELIVERY AT SITE: 48 Hour notice

AFTER RECEIPT OF ORDER. ARE QUANITITES LIMITED? NO, block is produced and inventoried. It is conceivable that an order would be so large that timing of delivery would need to be coordinated with the producer.

16. WILL A FREE SAMPLE BE FURNISHED? YES. If the WVDOT would like one.

17. APPROXIMATE COST: The cost of a ReCon Block varies by its size. However, a ReCon Block will generally cost from \$12 to \$15 per sq. ft. of face, fob the production facility. The deeper the block, the greater the price. The installed cost of a ReCon Wall will be about \$30 / sq. ft. This includes the block at about \$13, the freight at about \$2, the engineering at about \$1, the staining / sealing (if requested) at about \$2, and the installation at about \$12. These are all "per sq. ft." numbers.

18. IF PROPRIETARY, WHAT ARE RELATIVELY COSTS AND ON WHAT BASIS ARE THEY COLLECTED? ReCon Wall Systems, Inc. collects a royalty of \$3.00 per block from the licensed local producer. This is built into the price of the block that the customer is quoted. Royalties are collected on a monthly basis from the producer.

19. NEW ON THE MARKET? ReCon was incorporated in 2000.  
ALTERNATE FOR WHAT EXISTING PRODUCT? Segmental dry cast retaining wall units, MSE panel walls, gabions, cast-in-place walls, timber walls.

20. IS PRODUCT GUARANTEED? Warranty is as follows:

Each Block will have a 28 day compressive strength of at least 4000 PSI for 15 years after proper installation. If a Block does not meet this warranty standard, please notify the manufacturer in writing. If after it has been determined that the Block has not met the specifications, the manufacturer will have shipped to you, replacement Blocks which shall be the manufacturer's sole remedy for breach of this warranty. However, neither the manufacturer nor ReCon Wall Systems, Inc. shall have any obligation to install such replacement Blocks.

This warranty shall not apply to any Block which is damaged, defective or fails to meet the warranty standard due to improper installation of the Block, chemical contact, structural design of the wall, or excessive and unforeseen site conditions beyond the manufacturer's or ReCon Wall Systems, Inc.'s control.

The above warranty is the exclusive limited product warranty. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED

21. BACKGROUND DESCRIPTION OF COMPANY AND ITS PRODUCT: The system name is the "ReCon Retaining Wall System" developed by ReCon Wall Systems, Inc. (hereinafter "ReCon"). ReCon was incorporated in August of 2000 with a goal of developing a new class of segmental retaining wall block. Today ReCon has become known as a high performance retaining wall system with the look, scale and durability of massive natural stone. Due to their versatility, ease of installation, flexibility, and solid engineering backup, ReCon precast retaining walls are fast becoming the product of choice for a wide variety of commercial, residential, institutional, and public retaining walls and demanding water applications. Because ReCon Series 50 Retaining Wall Units (ReCon Units) are manufactured from wet-cast, air-entrained concrete, they are suitable for almost all retaining wall situations, including tall geo-grid reinforced walls, taller gravity walls, walls in water applications, and walls in areas where ice-melting salt spray is a concern.

A group of six individuals from the Minneapolis MN area came up with an idea to create a large wet cast air entrained segmental retaining wall block in 1999 / 2000. Eventually the group decided to create ReCon Wall Systems, Inc. in August of 2000 and move forward with their idea. Those investors included Michael C. Gresser, Joan Gresser, Michael J. Gresser, Matthew Barron, Tony Phillippi, and Stanley W. Hamilton. Originally the investors thought that they would focus on capturing "returned concrete" from ready mix operations for the

production of the block. That idea was abandoned in 2001, when the decision was made that a specified high quality mix design was required to produce the durability results that were being sought. The group of six investors had a broad and comprehensive experience set in business and in the construction industry. One investor was a "hardscape contractor" with substantial experience in building segmental retaining walls, using the small 80 to 100 pound dry cast segmental retaining wall blocks.

The goal was to develop a block that was (a) aesthetically pleasing, (b) very durable, (c) could be designed for tall unreinforced gravity walls and yet would also work for taller reinforced geogrid walls, and (d) was contractor friendly.

22. WHO RECOMMENDED THAT THE DIVISION OF HIGHWAYS BE CONTACTED? ReCon Wall Systems, Inc. and Peerless Brick and Block recommended the product to the WVDOT.

23. HAS ANOTHER DIVISION OF THE DIVISION OF HIGHWAYS BEEN CONTACTED? NO

24. ADDITIONAL INFORMATION: ReCon has previously submitted information to the West Virginia DOT. At binder dated 12/17/10 and a binder dated 7/18/11 were submitted to Thomas White.

25. THE FOREGOING INFORMATION IS FURNISHED BY:

NAME: Stanley W. Hamilton, President

ADDRESS: ReCon Wall Systems, Inc.  
7600 West 27<sup>th</sup> St., #229  
St. Louis Park, MN 55426